

Homestead Dam Feasibility Study

Public Informational Meeting
June 8, 2005



WELCOME!

Meeting Objectives

- ▶ To review the findings of the recently released Feasibility Study.
- ▶ To discuss issues related to the potential removal or replacement of the dam.
- ▶ To discuss the historical nature of the project area and the process under Section 106 of the National Historic Preservation Act.
- ▶ To air feedback on a future course of action.



Meeting Agenda & Format

6:30–6:45 pm	Welcome & Overview
6:45–8:00 pm	Feasibility Study Results
8:00–9:00 pm	Public Discussion
9:00–9:30 pm	Information Stations
9:30 pm	Adjourn

Project Partner Team

- NH Department of Environmental Services
- National Oceanic and Atmospheric Administration (NOAA) Restoration Center
- Town of Swanze
- Doug Brown, Dam Owner
- US Fish and Wildlife Service
- NH Fish and Game Department
- NH Division of Historical Resources

Purpose of Study

Study addresses multiple issues of concern, and enable a well-informed decision on an alternative that meets three goals:

- 1) Attains dam safety
- 2) Restores up- and downstream fish passage
- 3) Ensures stability of Thompson Covered Bridge



What's the Problem?

- ▶ **December 1997:** DES Dam Safety inspection
- ▶ **July 1998:** Letter of Deficiency
- ▶ **September 1998:**
 - Dam owner wishes to remove dam
 - Plan for the Restoration of Migratory Fishes to the Ashuelot River Basin (NHF&G)
- ▶ **August 2004:** Consultant inspection documents further deterioration in dam

Why Remove Dams?

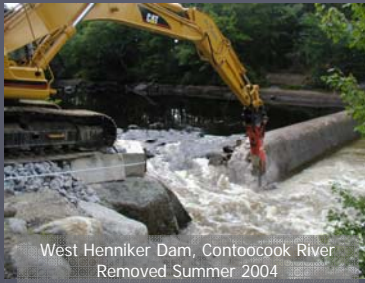
Nationwide thousands of dams (large and small) are at or near the end of their useful, safe and economical life.

Historically, dams were built with little, if any, consideration of their impact to the river system.

We've learned:

- Dams can be environmentally damaging
- Free-flowing rivers play vital roles in ecosystem health

Growing public appreciation for rivers and a desire to restore them



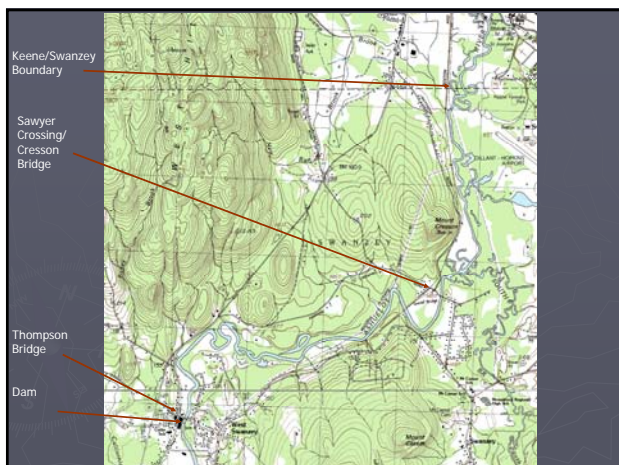
West Henniker Dam, Contoocook River
Removed Summer 2004

Significant Events

- **June 2000:** First Public Information Meeting
- **Spring 2002:** DES Wetlands application expires
- **January 2003:** DOT Completes Study on Bridge
- **February 2004:** DES Hires Consultant Team
- **May 2004:** Second Public Information Meeting
- **Spring – Winter 2004/5:** Consultant Team study results in draft report **March 2005**

Feasibility Study Review of Findings

- Dam Inspection
- Development of Project Alternatives
- Cost Estimates for Alternatives
- Environmental & Cultural Surveys
- Impacts & Benefits



Homestead Dam Facts

- Timber Crib with Concrete Abutments
- Current Dam Built in 1910 (1860?)
- 1992-1993 Repairs
- 12 ft high X 167 feet long
- 1998 Inspection found deficiencies
- 2004 Inspection found significant concerns



Project Tasks

- Dam Inspection
- New Topographic Survey
- Historical Investigations
- HEC-RAS Model Development
- Fluvial Geomorphology
- Development of Project Alternatives
- Development of Bridge Alternatives
- Cost Analysis of Alternatives
- Environmental Surveys & Impact Assessment
- Public Involvement



Range of Alternatives

- Alternative A – No Action
- Alternative B – Full Dam Removal
- Alternative C1 – Maintain, w/ Denil Fish Ladder
- Alternative C2 – Maintain, w/ Bypass Channel
- Alternative D – Dam Removal, w/ Rock Ramp
- Alternative E – Add Hydropower (w/ C1 or C2)

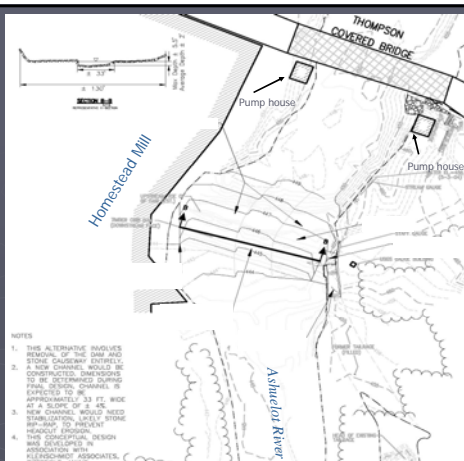
Alternative A: No Action

- Not feasible due to dam safety concern
- Baseline for comparison



Alternative B: Full Removal

Cost:
\$188,869



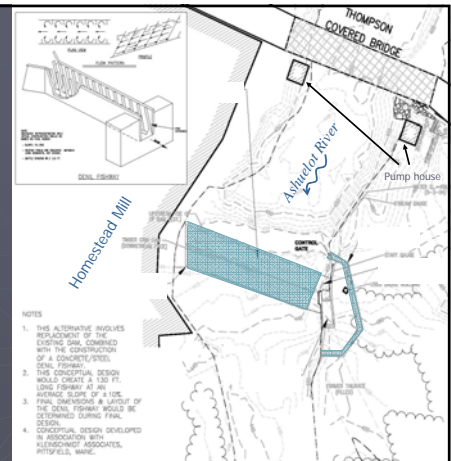
Alternative C1: Replace & Denil

Costs:

\$919,495
(Construction)

\$360,569
(30-year O&M)

\$1,280,064
(Total)



Denil Fishway Examples



Alternative C2: Bypass Channel



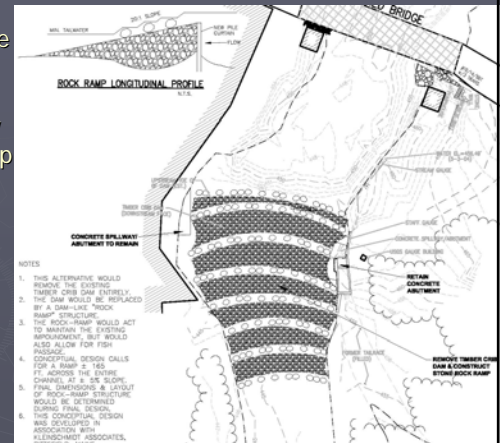
Alt C2: Bypass Channel (Nature-like Fishway)

Costs:

\$781,596	(Construction)
\$375,945	(30-year O&M)
\$1,157,542	(Total)



Alternative D: Full Removal with new Rock Ramp

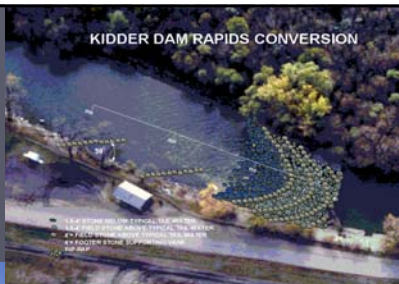


Rock Ramp Costs:

\$608,705
(Construction)

\$38,937
(30-year O&M)

\$647,642
(Total)



Alternative E Hydropower

- Studied in 1980s
- Determined not feasible
- Take a second look at potential economics
- Would require fish passage



Finding 2: Replace, don't Repair

- ▶ The dam is in very poor condition
- ▶ Planking shows 1–2 in. deterioration (3 in)
- ▶ Crib work is rotted/missing
- ▶ Missing ballast
- ▶ Factor of Safety = 1.12 (vs. FERC = 2.0)
- ▶ Replacement is only alternative to provide factor of safety
- ▶ "No Action" (Alternative A) is unacceptable



Finding 3: Existing Dam is leaking



Leaking Dam

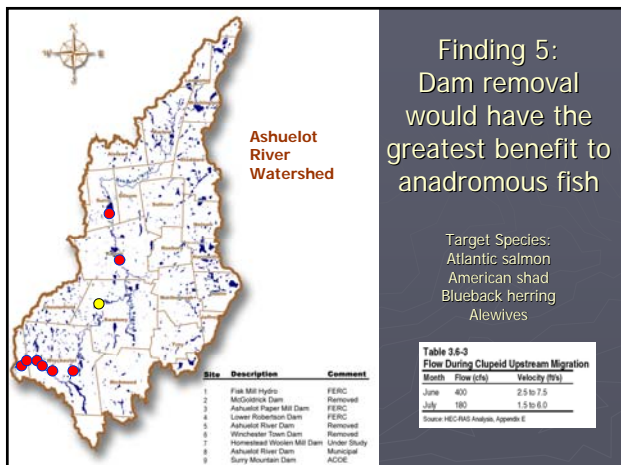
- ▶ Evidence of poor condition of dam
- ▶ Headpond is down relative to historical conditions



Finding 4: Fish Passage Options are Open

Any of the three alternatives could be made to work

- ▶ Denil Ladder (with replacement)
- ▶ Natural Bypass Channel (with replacement)
- ▶ Rock Ramp (form of dam)



Finding 6: Everything is expensive

KLEINSCHMIDT ASSOCIATES
Pittsfield, Maine 04967
207.487.3328

Dec - 28 - 04
P026
1153 - 001

Opinion of Cost

Project: Homestead Dam
Subject: Rebuild Crib Dam

Item	Description	Quantity	Unit	Unit Price	Extension	Total
1	Remove Existing Dam	1	EA	\$187,116	\$187,116	\$187,116
	Equipment and Labor					
	Crane	50	D	\$302	\$15,100	
	Excavator	50	D	\$1,501	\$75,050	
	Laborers	50	D	\$840	\$42,000	
	Supervision	50	D	\$360	\$18,000	
	Small Equipment	50	D	\$200	\$10,000	
	Materials					\$181,000
	Crib	30000	LF	\$1.75	\$52,500	
	Decking	6500	SF	\$3.00	\$19,500	
	New Rock	1100	CY	\$19.15	\$21,065	
	Fasteners	1	LS	\$2,000	\$2,000	
						\$110,815
	Contractor Costs (15%)					\$43,870
	Engineering					\$29,247
	Construction Monitoring (10%)					\$29,247
						\$551,553
	Contingency			15%		\$84,943
						\$645,943

Finding 6 (cont): And we mean everything

Table 2.7-4
Life Cycle Cost Estimates, by Alternative

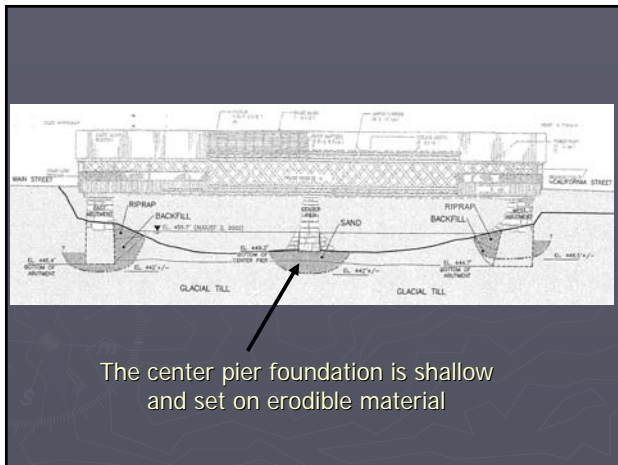
Alternative	Construction	O&M	Total (30 years)
A - No Action	\$0	\$0	\$0
B - Full Dam Removal	\$188,859	\$0	\$188,859
C1 - Replacement + Denil Ladder	\$919,495	\$360,569	\$1,280,064
C2 - Replacement + Bypass Channel	\$781,596	\$375,946	\$1,157,542
D - Rock Ramp	\$608,705	\$38,937	\$ 647,642

Notes: Construction cost estimates are summarized in Table 2.7-1 and detailed in Appendix D. Similarly, operations and maintenance costs are summarized in Table 2.7-3 and detailed in Appendix D.



Finding 7: The Thompson Covered Bridge pier needs long-term stabilization

- Scour analysis completed 2002 was independently checked with a new HEC-RAS model with same conclusion
- Center pier is susceptible to scour
- 1992 underwater inspection found evidence of undermining (6-8 feet horizontally)
- Rip-rap placed in 1993

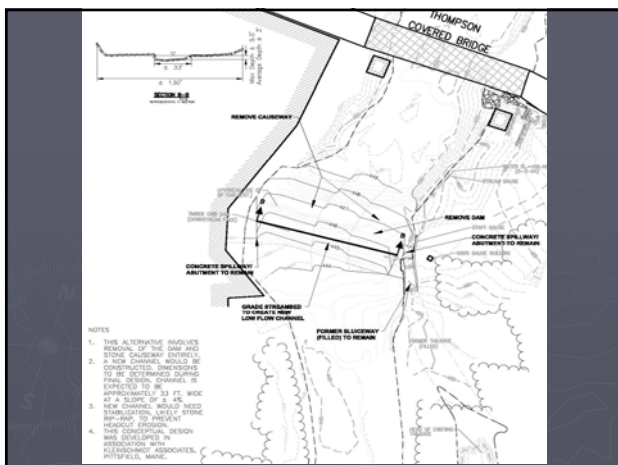


Thompson Covered Bridge Remedy

- ▶ Scour susceptibility should be addressed with either dam removal or retention
- ▶ Timing recommended by NHDOT:
 - If dam reconstruction, 5-10 year window, or
 - Prior to dam removal
- ▶ Recommend reconstruct center pier with new foundation & armoring = \$500,000
- ▶ State matching funds may be available

Finding 8: Headcut is likely, but can be mitigated

- ▶ Headcut is upstream migration of an erosion feature
- ▶ Geomorphology and Tractive Force Analysis both indicate likely consequence
- ▶ Channel reconstruction can mitigate – channel design and hardening



Finding 9: Impacts to visual character of the river diminishes as one moves upstream





One week after removal

Former Mounds Dam impoundment, Willow River, Wis.

Allowed to re-vegetate naturally

Aesthetic Concerns

15 months after removal

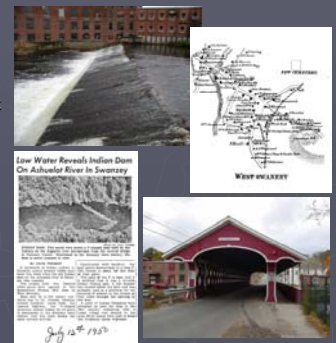
Finding 10: Historic resources could be affected

- ▶ Section 106 of the National Historic Preservation Act
 - Requires Federal agencies to:
 - ▶ Consider the effects of their undertakings on properties listed in or eligible for listing in the National Register of Historic Places
 - ▶ Explore alternatives to avoid or minimize harm to historic properties
 - ▶ Consult with State Historic Preservation Offices (NHDHR) and the public on these issues
- ▶ Similar review process for NH State projects



Historic Resource Studies

- ▶ Homestead Dam
- ▶ West Swanzy Village National Register Historic District Study
- ▶ Archaeological Reconnaissance Study
- ▶ Investigations of Effects on the Thompson Covered Bridge



Homestead Dam

- ▶ Earliest water power site in Swanzev (1730s)
- ▶ Dam may have been constructed as early as 1860 to serve the Stratton Woolen Mill and wooden ware shops
- ▶ Rock filled, timber crib dam
 - Reliable, economical dam design common in the Ashuelot watershed
- ▶ Quickly disappearing historic engineering resource



West Swanzev Village National Register Historic District Study

- ▶ West Swanzev first identified as a potential National Register Historic District in 1995
- ▶ Study undertaken to document the boundaries of the district and contributing resources



West Swanzev Village National Register Historic District Study

- ▶ Significance:
 - Earliest industrial site in Swanzev with a long and rich history of water powered manufacturing



West Swanzev Village National Register Historic District Study

- ▶ Significance:
 - Mill village reflecting 200 years of civic, residential, and industrial development
 - Outstanding group of architectural resources



Possible West Swanzev Village National Register Historic District



Archaeological Study

- ▶ Identified archaeological concerns, known archaeological resources, and areas sensitive for archaeological resources in the study area
- ▶ Ashuelot River has been site of human use and inhabitation for 10,000 years and is highly sensitive for archaeological resources



Archaeological Study

- ▶ Native American Sites
 - Swanzev Fish Dam
 - ▶ V-shaped boulder dam in upstream impoundment
 - ▶ Highly unusual and significant survival
 - ▶ First such intact structure to be documented in New England
 - ▶ Associated artifacts date to as early as 3000 years ago
- ▶ Historic Period Sites
 - Related to domestic, transportation, and industrial activities

Low Water Reveals Indian Dam On Ashuelot River In Swanzev



Potential Impacts to Historic Resources

- ▶ West Swanzev Village Historic District
 - Dam Removal or Replacement
 - ▶ Removal of important historic resource in the historic district
 - ▶ Mitigation measures would be required
- ▶ Archaeological Resources
 - Dam Removal
 - ▶ Potential to impact sensitive areas on river banks with increased water velocity
 - ▶ Minimization and mitigation measures would be required
 - All Options
 - ▶ Potential to impact archaeological resources in the vicinity of the dam through ground disturbing activities

Potential Impacts to Historic Resources

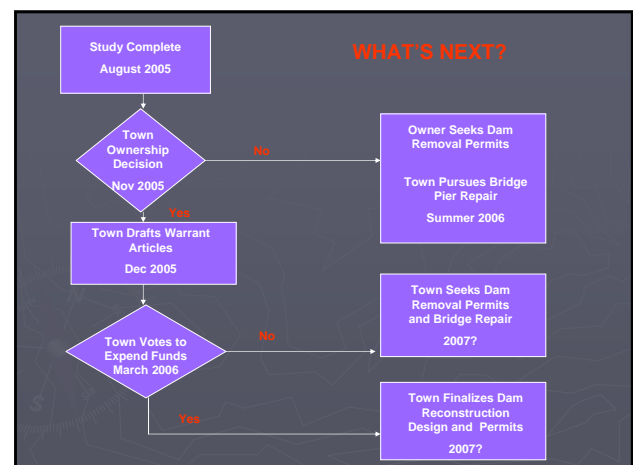
- ▶ Swanzev Fish Dam
 - Dam Removal
 - ▶ Slight drop in river depth at mean annual flow
 - ▶ No significant increase in tractive force
 - ▶ Potential for damage to fish dam is slight, but cannot be ruled out
- ▶ Thompson Covered Bridge
 - Dam Removal
 - ▶ Increased scour would require replacement of already susceptible central bridge pier

Finding 10: Other resources would be marginally affected by removal

- ▶ Hydrogeology is such that private wells are not likely to be impacted
- ▶ Fire fighting withdrawals would need to be retrofitted
- ▶ Recreation: May canoe race is likely not substantially impacted
- ▶ No sediment contamination
- ▶ USGS Gage relocation
- ▶ Rare species & communities – net benefit

Public Involvement

- ▶ Advisory Group Meetings
- ▶ Public Information Meetings
- ▶ Consulting Party Status (National Historic Preservation Act)



Homestead Dam Feasibility Study

Information Stations

- ▶ Historical Resources
- ▶ Thompson Covered Bridge
- ▶ Fisheries & Restoration
- ▶ Ashuelot River Local Advisory Committee
- ▶ Dam Safety

For more Info or Comments:

Deborah Loiselle
River Restoration Coordinator
NH Dept. of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

dloiselle@des.state.nh.us
(603) 271-8870
www.des.nh.gov/dam/damremoval

ADVISORY GROUP, attendees of May 9th meeting

Bob Beauregard	Town of Swanzey Selectman
Beth Fox	Town of Swanzey Administrator
Doug Brown	Dam owner, Homestead Woolen Mills
Pablo Fleischmann	Ashuelot River Local Advisory Comm.
Edna Feighner	NH Division of Historical Resources
Richard Scaramelli	Swanzey Master Plan Committee
Scott Self	Swanzey Planning Board
Lee Dunham	Swanzey Dept. of Public Works
William Snyder	North Swanzey Water & Fire Precinct
Fred R. Pitcher	North Swanzey Water & Fire Precinct
Sara Carbonneau	Swanzey Town Planner
Sylvester Karasinski	Interim Chief/Swanzey Fire Department
Mike Morrison	Swanzey Construction Commission

NEED LIST FROM BD